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Solar fuels: concepts, opportunities, and challenges

Solar fuels are chemical energy carriers, like e.g. hydrogen, methane, or diesel fuel, which are produced from sunlight through artificial photosynthesis or thermochemical reactions. A solar fuel allows one to store the energy of sunlight in chemical bonds and to use the energy at a later time or in a different location where and when sunlight is not available directly. Solar fuels can be seen as an alternative to fossil fuels.

In this talk, the concept of solar fuels will be explained and the potential of this technology will be illustrated within the landscape of renewable energies. Many technological challenges need to be overcome, and this talk will also focus on the role which theoretical modeling can play to overcome such challenges.